

Amendments to the Claims:

The following claims will replace all prior versions of the claims in this application (in the unlikely event that no claims follow herein, the previously pending claims will remain):

1-13. (Cancelled).

14. (Original) A method for preparing a chemically surface modified silica gel effective for adsorbing a target specie from a liquid containing said target specie suspended or dissolved therein, said method comprising

- (1) selecting a ligand molecule having a first functional group at one end thereof reactive with the silanol groups of silica and a second functional group at an opposed end thereof, said second functional group strongly binding to said target specie, as determined by at least one of bond energy between the second functional group and target specie or solubility product constant, K_{sp} ; and
- (2) reacting wet silica gel with the selected ligand in a hydrophilic co-solvent.

15-19. (Cancelled).

20. (Withdrawn) A chemically surface modified amorphous silica gel adsorbent comprising

- (i) bimodal pore size distribution of pores having pore diameters of about 10 nanometers and about 10 microns;
- (ii) ligand loading of about 7.5 mmole ligand per gram silica gel; and
- (iii) bulk density in the range of from about 0.2 to about 0.25 g/ml.

21. (Withdrawn) The silica gel adsorbent according to claim 20 wherein said ligand comprises 3-mercaptopropyltrialkoxysilane.

22-29. (Cancelled).

30. (New) Method of producing a chemically surface modified silica gel with a high ligand loading of up to about 7.5 mmole per gram of silica gel and open channel pore structure by either a direct one-pot reaction or by a two-step reaction, comprising:

- (a) creating and preserving a plurality of open channels within a silica gel structure having a plurality of silanol (Si-OH) groups on the surface thereof, while preventing crosslinking condensation prior to reaction of the silanol groups with a ligand-carrying silane coupling reagent;
- (b) reacting the plurality of surface silanol groups with the silanol groups of a hydrolyzed silane coupling agent in a mixed aqueous solvent medium, under an inert atmosphere and at an elevated temperature within the range of from 40° C to 80° C, to cause condensation and reaction with substantially all of the plurality of surface silanol groups, to thereby form said chemically surface modified silica gel with high ligand loading and open channel pore structure; and, optionally,
- (c) drying the chemically surface modified silica gel having the high ligand loading and the open channel pore structure with minimizing the formation of crosslinking of the surface silanol groups.

31. (New) Method according to claim 30, which is carried out as a one-pot reaction, wherein step (a) comprises using the hydrolyzed silane coupling reagent as a surfactant and alcohol as a co-solvent to assure ligand compatibility with silica sol and causing the reaction of step (b) followed by gelation in the same reactor, and drying the resulting chemically

surface modified silica gel to thereby obtain said high-ligand loaded chemically surface modified silica gel.

32. (New) Method according to claim 30, which is carried out as a two-step reaction, wherein step (a) comprises maintaining a freshly prepared silica gel at a temperature in the range of from 40°C to 80°C in a moist state for about 30 to 60 minutes to obtain a wet nanoporous silica gel, and step (b) comprises introducing a silane coupling agent and cosolvent to the freshly prepared silica gel, and reacting under said inert atmosphere and at said elevated temperature to form said surface modified silica gel.

33. (New) A method according to claim 31, which further comprises adjusting the pH to induce gelation.

34. (New) A method according to claim 30, wherein the mixed aqueous solvent medium is an aqueous alcoholic medium.

35. (New) A method according to claim 34, wherein the alcohol is ethanol.

36. (New) A chemically surface modified silica gel produced by the method of claim 30.

37. (New) A chemically surface modified silica gel produced by the method of claim 31.

38. (New) A chemically surface modified silica gel produced by the method of claim 32.

39. (New) The chemically surface modified silica gel according to claim 36, wherein the ligand-carrying silane coupling reagent is 3-mercaptopropyltrialkoxysilane.

40. (New) The chemically surface modified silica gel according to claim 37, wherein the ligand-carrying silane coupling reagent is 3-mercaptopropyltrialkoxysilane.
41. (New) The chemically surface modified silica gel according to claim 38, wherein the ligand-carrying silane coupling reagent is 3-mercaptopropyltrialkylsilane.
42. (New) A method of removing metallic impurities from a liquid which comprises contacting the liquid with the chemically surface modified silica gel according to claim 36.
43. (New) A method of concentrating metallic content in a liquid which comprises contacting the liquid with the chemically surface modified silica gel according to claim 36.
44. (New) A method of separating two or more metallic impurities from a solution of the mixture of metallic impurities which comprises passing the solution mixture through a column packed with the chemically surface modified silica gel according to claim 36.
45. (New) A method of recovering metal from a low-concentration feed solution which comprises contacting the feed solution with the chemically surface modified silica gel according to claim 36.
46. (New) A chemically surface modified silica gel produced by the method of claim 14 which further comprises
- (a) creating and preserving a plurality of open channels within a silica gel structure having a plurality of silanol (Si-OH) groups on the surface thereof, while preventing crosslinking condensation prior to reaction of the silanol groups with a ligand-carrying silane coupling reagent;

- (b) reacting the plurality of surface silanol groups with the silanol groups of a hydrolyzed silane coupling agent in a mixed aqueous solvent medium, under an inert atmosphere and at an elevated temperature within the range of from 40° C to 80° C, to cause condensation and reaction with the plurality of surface silanol groups, to form said chemically surface modified silica gel with high ligand loading and open channel pore structure; and, optionally,
- (c) drying the chemically surface modified silica gel having the high ligand loading and the open channel pore structure with minimizing the formation of crosslinking of the surface silanol groups, thereby forming a chemically surface modified silica gel having a high ligand loading density of up to about 7.5 mmole per gram of silica gel and open channel pore structure.

47. (New) A method of separating a target specie from a ligand containing said target specie which comprises contacting the liquid with the chemically surface modified silica gel of claim 46.

48. (New) A chemically surface modified silica gel according to claim 46, wherein said second functional group strongly binds to an organic target specie.

49. (New) A method for removing oil or other organic chemical contaminant spilled on the surface of a body of water, comprising contacting the contaminated surface of said body of water with the chemically surface modified silica gel according to claim 48, whereby the oil or other organic chemical contaminant at least substantially adsorbed by said gel and thereafter removing the gel from the surface of said body of water.